GPDE 5256A Wikis, Podcasts, and Online Learning for K-12 Classrooms

Implementation Plan

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Part I:

Have you ever found yourself in a position similar to the following- You are talking with a colleague because you are frustrated with the fact that your students can't make connections. You say "If they come across a problem in the homework that is slightly different than the one I presented in the lesson, they can't see how the two relate to each other and apply the idea from the lesson to the new problem". I have often been frustrated with this idea in math, particularly when students get to the dreaded "word problems". Prior to this class, I often thought of word problems as an almost "fake" way to add real-world into math. If we're learning about linear equations, all students really need to do is pull out the slope and y-intercept, write an equation and perhaps solve it for a given value. I now realize that there are flaws in this thinking. Perhaps the real reason students struggle with this type of problem is because it requires a lot of the skills many employers are now looking for- skills termed "21st Century Learning". Word problems require students to dissect the problem: to understand how the problem evolved, know why certain things are important, determine what they already know and how everything comes together. They need analytic skills, to apply concrete ideas in an abstract way to develop and execute a solution, to think of alternate solutions and once solved, determine if their solution is viable. These processes fall under such broader categories as critical thinking, problem solving, innovation, self-direction, and analyzing information.

Many people have attempted to define 21st century learning and each one defines it just a little differently. Some focus on technology and digital literacy, many more share habits and skills ranging from critical thinking to curiosity, and others consider how to coordinate both these ideas with formal learning in relevant and effective ways. Two ideas that I strongly agree with are: 1) We need to shift importance from knowing the right answers to asking the right questions and 2) We not only need to teach the 3 Rs but also the 4 Cs (Creativity, Critical Thinking, Communication, and Collaboration). These two separate types of skills are intertwined and both are equally important. Too often in math- in my classroom as well- we rush through the process of solving a problem and don't take time to discuss why we use this process, if other processes might work, or show them how this process stems from those previously learned. It isn't that I don't want to talk about these things, but they take time and I have a lot more standards to cover before the course is through. Delving into 21st century learning has reminded me why the hows and whys are also important (maybe more so) and maybe won't take as much time as I anticipate.

I have always felt our job as educators is to prepare students for the real world and to guide them on their journey to becoming life-long learners. In fact, I often talk about this idea with students on the first day of any course and remind students of this conversation when they ask "Why do we need to know this?” This 'talk' has always used the words problem solving, reasoning, and critically thinking. Therefore, these skills are not completely new to me. My struggle was- in addition to telling students these skills are important-, how do I really get them to agree with and embrace the importance of them. As a result of this class I hope I have found some ways to do just, that but it has also raised another question: How do I add meaningful activities into an already packed schedule that will help students develop these skills.

The idea of higher-order thinking is not new. Bloom's taxonomy was introduced in 1956 and included words like analysis, synthesis and evaluation. While it was recently revised in the 1990s to use words that more closely reflected 21st century work, the types of intellect are still the same. Many of the 21st century skills are from levels (or combinations of levels) near the top of the pyramid. For example, critical thinking involves using the skills of analyzing and evaluating. But because the real world is changing, the way in which we prepare our students needs to be adjusted as well. *What* we're teaching isn't much different than what has always been taught, it is *how* we are teaching it that may be different.

Studies have shown that students do not learn well by listening passively. When students are engaged and involved in the learning process it leads to richer learning experiences for students. This is primarily why web 2.o tools can push students up Bloom's Pyramid. Web 2.o provides opportunities for students to be connected to one another, to be creative, and to interact with ideas and/or other students. When students participate in ways that they feel are socially relevant, their learning will be more personal, meaningful and often collaborative. The Partnership for 21st Century Skills stated "fusing a core subject like math with 21st century skills makes teaching and learning more engaging, more relevant, and more rigorous, ensuring that students have an advanced level of understanding and ability in math". I spent the most time in the web 2.0 theme mostly because I haven't used many of these tools in my classroom. I didn't just want tools that others recommended for math. What works for one person doesn't always work for another. I wanted to find tools that I could actually see myself using in class. I also looked for tools that would be relatively easy for me to implement or for students to use. There are way more tools available than I ever imagined and really feel I can implement my 'top ten' with success. Once I determine if these tools are keepers, I have a waiting list I can pull more from.

Social media and web 2.0 tools allow flexible scheduling providing a means for us to stay up to date. We can further our careers without even having to leave home, often at little or no cost. We can interact with others, give and receive feedback or simply research ideas. As we learn new strategies, techniques and current trends through social media and the use of web 2.0 tools, we grow as learners. When we grow as learners, we are able to improve student achievement and as we become more successful at helping our students, we grow as teachers. I find myself asking "Why didn't I think of this before?” I never saw myself as a blogging type but once I started exploring the myriad of people with great ideas, insights and techniques to share, I had a hard time choosing just 6 blogs to follow. I know I am not limited to 6 but I wanted to start with a reasonable number to explore, decide if they are in line with my needs, and if I can manage my time with keeping up to date. At some point, I know I will add to this network of professionals.

As a result of this exploration into 21st century learning and teaching, web 2.0 tools and using social media as a means of professional growth my toolbox is overflowing with ideas, excitement, anticipation, and a hunger to keep looking for more. On one hand I am a little nervous. Change is difficult. It often means taking risks. Some of the technology is a little out of my comfort zone. I wonder if I will catch flack from department members for doing things differently. Life is busy and it takes time to both research tools and learn how to use them before presenting them. However, my desire and commitment to try new ideas and change what many students have probably considered 'just another boring math class' is stronger than these small worries. I hope to have a classroom where not only do I do more questioning and modeling, but also where students are given opportunities to do the same. It may be a stretch, but I hope my students are so busy 'talking' and exploring math that the thought of asking the question "why do we need to know this" never crosses their mind. I might not get to this point next year, but I hope to keep adding and changing things until I can accomplish this task.

Part II:

As I stated earlier, I plan to approach learning next year by doing more questioning and modeling as well as providing opportunities for students to do the same. In the past, I usually start class by answering questions on the homework from the day before. To save time, I write the problems with questions up on the board, work through them and then either correct or collect students' assignments. I plan to take a more collaborative approach to this process next year. One idea may be asking if another student has an answer to the question or even just a suggestion before I work through it. As the problems are worked through I want to encourage more discussion about what we already know- what facts and assumptions do we have, how does it relate to something we've already done, and once a solution is found discussing whether the answer is reasonable and if there are alternate solutions or approaches to the problem. I hope to see the students really listen to one another and feel comfortable evaluating other students' reasoning as well as offering improvements and corrections. I want to focus on learning from our mistakes and encouraging students to not give up but make repeated attempts at solving problems.

I plan to have students use Quizlet in our geometry class, particularly with the year-long class. This class is typically for students at a lower level than our traditional geometry. They spend three trimesters covering virtually the same material as our regular students cover in two. In general, students have a hard time making the switch from algebra to geometry. Suddenly, students don't just have to know mathematical procedures but they also need to know vocabulary and lots of it. After looking into this website, I feel it will be an engaging and effective way to help students stay on top of remembering these many new terms.

Another website I plan to take advantage of is NCES Kids' Zone. This website houses a lot of information and many activities. There are three that I plan to implement in my classes: Math Teaser, Dare to Compare, and the Mathematician Quiz. Math Teaser and Dare to Compare could both be used as openers or warm-ups at the beginning of class. The Math Teaser has a more challenging problem to answer with a worked out solution available for viewing. It is typically changed once a month but there is an archive with prior teasers available. Dare to Compare allows you to pick a subject, grade level and the number of questions you wish to complete. Once you've answered the questions, you have the option to view how you compare nationally or with your specific region of the United States. I think these two activities will encourage dialogue in class as students work through problem solving and critical thinking skills. The Mathematician Quiz has you complete a profile so they can connect you with a mathematician that may share some of your interests. I think students would be more engaged by taking this quiz than either being assigned a mathematician or even choosing one themselves. They will be required to do some research and share their findings with the class through a web 2.0 tool such as Prezi or Fakebook. Through their research and presentation, students will address the skills of evaluating and creating.

In addition to giving the option of using Prezi for their mathematician presentation, I would also like to implement the use of this tool in the regular geometry class to have them present a lesson to each other. I would like to have students use Prezi in our first unit where students learn about measuring angles. I feel this lesson would be an ideal place to implement this strategy because students are already familiar with most of the vocabulary. Since they have been introduced to these concepts in previous courses, they do not require direct instruction. Therefore, I could allow students to experiment with this tool and I will not be anxious about losing limited time. They could work in groups and each group will present a piece of the lesson. For example, some topics students could present on include: definitions, naming angles, measuring angles, classifying angles, and congruent angles. Or each group could present the entire lesson and they could compare their presentations to each other. This would take the place of the typical presentation of notes. The traditional method would focus on remembering and understanding. Introducing this lesson via Prezi would require students to also analyze and create through collaboration.

EdCanvas is another presentation tool that I need to explore further but looks like it has a lot of potential. I can see using it myself as an alternate type of presentation or used by the students as a presentation tool. The latter is how I plan to implement it next year. My plan is to use EdCanvas with the geometry students in the quadrilateral unit. Each student will be assigned a type of quadrilateral (rhombus, for example) and will use their canvases to share with others the properties their shape has. Without leaving the site, students can search You Tube or Google (or many other sources) for properties of their shape and simply drag and drop the ones they feel are best onto their canvas for sharing. They also have the option to simply insert text.

Nrich Mathematics is a website with many activities that I believe will require students to analyze and evaluate mathematics. These activities appear to be engaging and ask students to explore, question, and discuss math. This particular website has a large number of activities that can be sorted by topic or age. Each activity includes printable resources for both students and teachers as well as possible solutions. I will need to do more exploring to find good problems that will fit in well with my classes. One possibility is an activity called "Fence It" that has students delve into maximizing the area of a rectangle under three different restrictions. This activity would fit in with the lesson on basic perimeter and area in chapter 1 of geometry.

Mathalicious is a website similar to Nrich. The problems through Mathalicious are real-world based. Problems include a lesson plan, video, and handout. I haven't had time to look beyond the free samples on the home page but based on the quality of these problems I am excited to find lessons that will fit with the content I teach next year. The one downside to this tool is it requires a subscription but it does have the option of a "pay what you can" per teacher plan as well as a school/district plan.

Gizmos is another site that I am really excited about. This site has interactive simulations and can be sorted by standard, topic, or textbook. Gizmos offers students a fun way to develop a deeper understanding of mathematics through inquiry and exploration. Like Mathalicious, it requires a subscription but has a 30 day free trial that I plan to use. I am in the process of talking with other department members about the possibility of canceling a subscription to Geometer's Sketchpad and replacing it with a subscription to Gizmos. Very few of our teachers use Sketchpad. Geogebra is a free online tool that offers many of the same activities as Sketchpad. I think Gizmos would be a valuable tool in terms of increasing student engagement and promoting higher level thinking, thus justifying this replacement.

One tool that I plan to use to help keep me abreast of professional development is Feedly. This will compile newsfeeds from all of the blogs I have elected to follow into one easy place. My goal for the year is to check this at least once a week and spend at least an hour perusing new posts.

The first year of implementing anything always has challenges, most often the amount of time it takes to plan for these activities. I also anticipate challenges with students as they will need time to develop the 21st century skills, especially with regards to the depth of their communication. I think students will be excited about the digital nature of these additions but will have a harder time learning how to "talk" and "question" during class. I will also have to look deeper into whether there is anything I am currently doing that can be replaced or if I will simply be adjusting the usual presentations and assignments with these implementations. I am also nervous about following through with my professional network of educators. I have a hard time staying current with my personal email. I hope by picking a day each week to keep up to date will help me follow through as planned.

Another challenge will be the availability and functionality of computers. The laptop carts will need to be signed out ahead of time and there always seems to be issues with these computers. They often have a hard time holding their charge for the entire period, select computers are in need of repair and are out of order, and depending on the number of students in class, some students may have to double up on a machine. These issues are frustrating and de-motivating for both the students and teacher. There is the option to bring the class to the computer lab, but this again depends on availability.

Part III:

Assessment and evaluation of the implementation could be complex. How do I tell if students possess the skills of collaboration, communication, critical thinking, and creativity? These student behaviors can be hard to interpret, especially because often they are intertwined with one another. I think the two main pieces I will use to assess the effectiveness of my implementation will be observation and reflection. In this respect, it is important that students learn to make their thinking and reasoning visible; that they share their thinking verbally or written, with one another or with the teacher.

If I am truly successful at implementing my plan, students will be more engaged and motivated in class, leave less problems blank on their daily assignments, they will ask less questions that seek the right answer or a specific direction, they will dialogue effectively and more frequently, they will ask more probing questions, offer suggestions or alternatives to classmates, their attitudes and willingness to participate will change, and ultimately they will perform better on classroom and standardized assessments.

The specific data that I will have available to make comparisons with are classroom averages over time for unit summative assessments. Do these students show improvement in their performance over previous classes? I will also have students complete an evaluation near the end of the trimester, giving them a chance to rate the effectiveness of the changes in their engagement, motivation, relevancy, rigor and comment on the changes that have occurred and how they feel it has affected them as students.

I will determine if the professional development piece has been successful by how often and how well I use this resource. I think once I get into the habit of regularly checking into these networks, I will find myself excited and intrigued to find more great information and ideas from them. If I do, then the implementation has been successful.

For all areas (21st century learning, web 2.0 tools, and professional growth) I will have to reflect on the changes that have been made, my observations in class, how students are performing, their survey responses and personal reflections and decide on the effectiveness of each change. I will embrace what works and share these ideas with others in my department. For those changes that are not as effective, I will determine if they can be more successful by making small changes or throw it out and find something else to use in its place.

Part IV:

In recent years, there has been a paradigm shift from classrooms that are teacher centered to student centered. Teachers are no longer considered the "fount of all knowledge" or the "sage on the stage". They now are asked to take on roles such as facilitators, coordinators or guides. Learners are no longer rewarded for knowing the right answer but for asking the right questions. The idea that a student is proficient if they can read, write and do arithmetic has been changed to whether they can communicate, collaborate, think critically and be creative (Heick, 2012a; Partnership for 21st Century Skills [P21], n.d.).

The internet and social media are designed to connect. While our students *are* constantly connected through these sources, they are not using them to the full extent that they could. We have to help our students develop new habits, new ways of thinking and reflecting, new ways to learn in the presence of information abundance. Many of the articles on 21st century learning listed the following habits: critical thinking, problem solving, collaboration, adaptability, entrepreneurialism, communication, analyzing, curiosity, and global awareness- as well as information and media literacy. These habits involve skills such as questioning, innovating, thinking interdependently, persisting, managing impulsivity, even responding with awe. These skills are becoming increasingly relevant. These are the skills most companies and employers are saying they are looking for and they find people are increasingly unprepared for the workplace (Heick 2012b; P21, n.d.; Wagner, 2008). Not all of these are the skills we may have grown up with, and some have certainly shifted in emphasis and importance, but they are the skills that are being used in the workplace today. These skills represent the future of our students.

We can't expect students to learn these habits simply by telling them they exist or naming what skills are needed. It’s one thing to remind students to "persist in the face of adversity" and another to create reasons and opportunities for them to do so (Heick, 2012b). Though most of the focus around 21st century learning is around the learner, there are skills that teachers need to embrace as well. By possessing these skills or working towards achieving them, we can broaden our repertoire of ways to create relevant opportunities for students. As teachers, we should share and model the use of internet tools and assist students as they build their learning networks. We also need to provide ample learning opportunities for students to become digitally literate as well as inspire every student to be quality digital global citizens. We should demonstrate and model many of the same skills we expect students to have, giving us such roles as collaborators, visionaries, learners, communicators, and adaptors as well as the roles of risk-takers, models and leaders. (Kharbach, 2012).

There are some sources that would say the factual isn't needed anymore as students could simply look up a fact if they need to know it, or even that we *only* need to teach online skills. However, I tend to agree with those that argue we need both skills and knowledge. Many of the skills and processes shared so far are intertwined with and can't be separated from the factual knowledge base. In fact, this knowledge is the basis of using these skills. For example, if one wants to be innovative they have to know what has already come before. In order to collaborate and participate in the larger conversation, we need to know what has already been said so that we can *add* to it. In the video *Rethinking Learning: The 21st Century Learner*, Mimi Ito, an associate researcher from UC Irvine states "What we're saying by valuing informal learning is not that we should abandon formal learning, but that we should get those working together in a much more coordinated way" (Heick 2012, Paul 2013, MacArthur Foundation, 2010).

It is imperative that we as educators not only foster these 21st century skills in our learners but make education in general more relevant and meaningful. Will Richardson says, "Information and knowledge are everywhere. Our kids can learn whatever and whenever they want". There are "two billion teachers at their fingertips". If we don't make what we're doing relevant, they will find other ways to educate themselves and we will be without a job. I believe incorporating more web 2.o tools into our practice- for both presenting and assessing- is a key to making what we do relevant and meaningful to students (TEDxTalks, 2011).

By incorporating web 2.0 tools into our classrooms, students are more easily engaged. These tools will allow them to explore ideas firsthand and gives them more freedom to create according to their own ideas and interests. When students are engaged, they are more apt to show initiative and personal responsibility. These tools also require students to be involved in the learning process leading them to richer learning experiences. Web 2.0 tools also provide students with opportunities to work together, thus encouraging collaboration and reflection (Morrison, 2012).

Greenhow, Robelia, and Hughes (2009) share the idea that "computerization of routine tasks...frees learners' and teachers' minds for more demanding higher-order thinking" (p. 248). We can now save time by modeling an idea quickly through the use of web 2.0 tools and focus on our questioning techniques or make problems more meaningful and memorable because students were able to quickly manipulate and change problems thus uncovering the idea themselves.

The digital nature of these tools also allows students to collaborate without actually 'getting together'. No need to figure out where your group is going to meet and make arrangements to actually get there, students can simply 'link up'. They can also share quickly and conveniently with a partner, group, class, teacher, or with the world. This interconnectedness, along with the interactivity and creative capabilities creates a "participatory culture" that could promote "potentially rich opportunities to make learning more personally meaningful, collaborative, and socially relevant" (Greenhow et al, 2009).

The abundance of interesting resources on the web available to supplement instruction can be overwhelming. These resources, however, are not just limited to ways we can supplement instruction. There is also an ever growing body of literature, feedback, and advice that we can use to advance our professional development. There is opportunity, if desired, for constant interaction between professionals through following blogs or twitter (Weston, 2013). We can stay up to date with new trends as well as learn fresh strategies, techniques, and methods nearly any classroom challenges we may face. We can collaborate, give and receive feedback, and research ideas (Dove, 2010).

There are also many advantages to using the web for our professional growth. It allows flexible scheduling for us. We can do it when, where, and as often as we would like. There is no commute involved. We can further our careers from our own home, using our own device and need not pay anything for it. The ease of use and abundance of materials does present one main challenge- it can be time-consuming. We will have to use our judgment to decide how much or how often is best for us (Dove, 2010).

One of the skills believed to be an important contribution to the 21st century teacher is the participation in professional networks (Kharbach, 2012). It is also believed that professional development should be regular and continuous. The web provides an easier way to achieve these characteristics. Progress also involves taking risks. The resources we have available to us online provide numerous ways to challenge our beliefs whether it is in regards to what we do or how we do it. We develop professionally, or grow as teachers, when we increase our knowledge and become more successful at helping our students. This helps teachers improve student achievement (Dove 2010, Weston 2013).

This class has forced me to move outside of my typical comfort zone. I have learned so much about what skills are important for students to have and why. I have learned how to keep students engaged and to make school more meaningful and relevant. I have also learned how to continue to grow as a professional in ways I never would have thought. This will open many new doors for me, keep me up to date with current trends and practices and ensure that there is always one new idea just waiting to be tried. This new knowledge will help me to become a better teacher and help my students to leave my classroom better prepared for their futures and life in general. Not only will my students be developing skills to become lifelong learners, but I will be walking on that journey with them.

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